Governor's Office of

Economic Development

Centers of Excellence

Jon M. Huntsman, Jr.
Governor

20th ANNIVERSARY REPORT
(1986-2006)

Jason Perry ◊◊ EXECUTIVE DIRECTOR
Governor's Office of Economic Development

Gary Harter ◊◊ MANAGING DIRECTOR (beginning May 2007)
Business Creation Team, Governor's Office of Economic Development

Greg Jones, PhD ◊◊ MANAGING DIRECTOR (through May 2007)
Business Creation Team, Governor's Office of Economic Development

Nicole Toomey Davis, MBA ◊◊ DIRECTOR
Centers of Excellence Program

Vincent Beerman, MBA ◊◊ Primary Report Author
Centers of Excellence Program

Danica Nelson ◊◊ Report Contributor
Centers of Excellence Program

Executive Summary

The Centers of Excellence program has a 20 year history of helping mature technologies developed at Utah's colleges and universities and bringing those technologies into the marketplace. The purpose of the Centers of Excellence Program (COEP) is to accelerate the commercialization of promising technologies that have value for Utah.

This report will explain the program's objectives and operations, detail the technology and commercialization progress of each Center and evaluate the economic impact the program has generated for the State of Utah.

Since its inception in 1986, the program has helped create thousands of high-tech jobs, assisted in the creation of spin-off companies, and by improving technologies and processes has helped hundreds of Utah companies experience tremendous growth.

Over the first 20 years of the program, the Centers of Excellence Program has generated more than 186 patents, resulting in 226 license agreements[1], and 126 plus Utah based companies have been created to license and market proprietary technology fostered by the program. 55 of these spinouts are still "alive" in Utah, three are alive out of State, and another 11 have been acquired and moved out of state. As of this report, the Utah companies directly employ over 2035 persons in the state, at an average salary over $65,000.

Well-known firms that have been assisted by the Centers of Excellence program include Myriad Genetics, Inc. (MYGN), Sonic Innovations, Inc. (SNCI), Moxtek, Cimetrix, and Autonomous Solutions Inc. Emerging successes include InfoWest, Live Wire, Andigen and Rocky Mountain Composites and startups just emerging from the Centers program in the past two years include Flying Sensors, Procerus Technologies, Wasatch Microfluidics Inc., and Glycosan Biosystems. These firms are among the many companies strengthening Utah's economy through technologies developed at Utah's colleges and universities.

These firms and many more, continue to generate new jobs in Utah and strengthen Utah's high tech business community and are strong examples of the compelling research being created in Utah's colleges and universities.

This report summarizes nearly a year of primary research to identify the results of the past two decades of the program. Extensive work was done by two interns beginning in May 2006 through February 2007. Vincent Beerman began the study and gathered the bulk of the data and performed the initial analysis, and Danica Nelson provided additional research and analysis. Vincent and Danica contacted 81 of the program's 111 principal investigators to gather data about the fruits of each of their Centers and what had happened. They then reached out to the actual companies to quantify these results. This report is the first time such a comprehensive look had been taken at the program and reveals both a tremendous "startup rate" for the Utah Centers of Excellence program, and opportunities to further improve the success rate of "significant growth" among the spinouts from the program.

[1] Patents and license agreements were compiled from historical annual reports. These reports changed formats multiple times throughout the history of the program, thus this data is only as accurate as these reports allow.

The Centers of Excellence Program Definitions

Utah State Law

Chapter 63-38f-703 - Definitions
"Centers of Excellence" means university-based, industry-supported, cooperative research and development programs.

Chapter 63-38f-901 - Purpose statement
The Legislature finds and declares that the fostering and development of industry in Utah is a state public purpose necessary to assure the welfare of its citizens, the growth of its economy, and adequate employment for its citizens.

The purpose of the Centers of Excellence Program (COEP)

To accelerate the commercialization of promising technologies that have strategic value for Utah. The COEP, which is part of the Business Creation Team in the Governor's Office of Economic Development (GOED), accelerates this commercialization process in three critical ways:

1. By selecting the most promising technology maturation proposals from those submitted by University-based research teams
2. By providing the grants to the teams to help mature the technology so that it will be attractive to potential investors and customers
3. By finding highly qualified Business Team members to help develop the plans and begin implementation of the plans to take the product to market

Additional definitions:

Benefiting Company

- Any company other than a spin-out that is using the technology from a Center in a substantial way, frequently an existing company that is a licensee of the technology.

Business Team

- Seasoned, proven technology executives and entrepreneurs recruited by the COEP to help develop strong business plans and go-to-market strategies for each Center. Although recruited on a part time "consulting" basis, these are individuals who are truly part of the Center team and are widely considered the "secret sauce" to the success of the Centers of Excellence program.

Center of Excellence

- Located at a Utah institution of higher learning, a "Center" is a designated university-based team which has previously developed specific, commercially attractive technology under Federal or corporate sponsored research grants, and which needs assistance in moving the technology forward to a "product" or "near-product" stage.

Companion Spin-out or Licensee Grants

- A company (spin-out, startup, or licensee) that forms out of a Center (i.e. is a Spinout) and receives direct assistance to the company from the Centers of Excellence program. Such a company also licenses the Center-developed technology and may also be referred to as a "Licensee."

Companion Spin-out Grants

- Funds awarded to a Center spin-out which has demonstrated that funds granted directly to the spinout would substantially accelerate job creation and economic development in Utah. These direct grants are awarded on a competitive basis and require matching funds (typically 1:1) from investors, revenue or founders.

Distinguished Center of Excellence

- A Center receiving funding in excess of $10 million or national recognition. These centers are allowed special funding beyond graduation if proposed projects are deemed worthy by the Advisory Council, Note that this was used earlier in the program's history but is rarely used at this time.

Faculty, Graduate Student and Post Doctorates Employed

- Positions being funded directly to support the Center's activity within the university setting

Graduated Center of Excellence

- The Centers of Excellence program helps specific technologies developed at a university move into the marketplace. As such, a maximum funding term of 5 years was provided from 1986-2005. Starting with the 2005-06 fiscal year, this was changed to a maximum of 4 years. The change was intended to help accelerate the time-to-market of these promising technologies and has had the practical effect of condensing the same total funding into a shorter period of time.

Industry Jobs Created

- Those jobs that have directly or indirectly resulted from activity at a Center.

Principal Investigator (PI)

- Also referred to as a Center Director, a PI is the principal researcher at a Center.

Spin-out Company

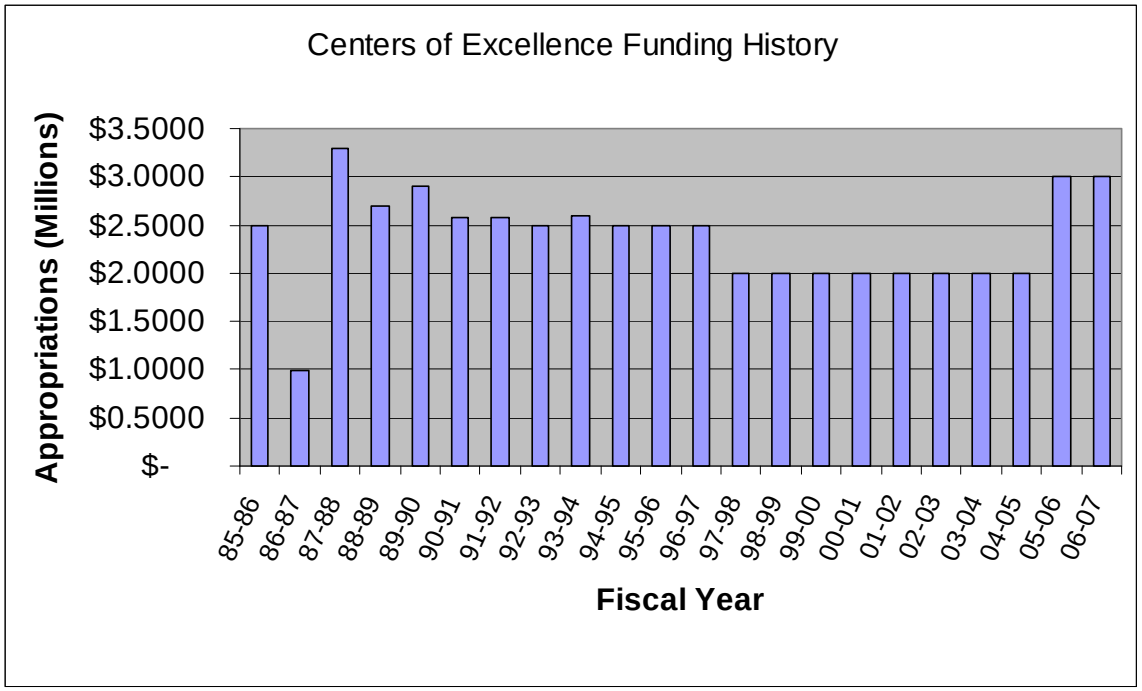
- Any startup company that is created directly as a result of Center technology.

Background

Recognizing that the growth of new industry and the expansion of existing industry in the next century would require both a strong technology base and a steady supply of new ideas, concepts, innovations, and prototypes, the Utah State Legislature created the Centers of Excellence Program (COEP) in 1986. The Legislature has recommended the allocation of economic development funds annually to the COEP, generally to be awarded to college and university faculty on a competitive basis. The objectives of the COEP are to support maturation of technologies that have potential for economic development in the state and assist in the commercialization of those technologies.

This technology commercialization process results in job creation through the formation of new companies and the enhancement of business opportunities for existing companies. In addition, the value of technologies created is further reflected in the number of patents issued and the associated royalty-bearing licenses that are signed. The State does not assume any equity positions in the licenses. Instead, the return on investment to Utah comes from converting university developed technologies into job creating products and services through spin-out or existing businesses.

Ongoing funding of the program has varied during the years. The program started in 1986 with $2.5 million in funding and maintained approximately that level until 1996-97.
Following the 1996-97 fiscal year, the program's funding remained at $2 million per year, and returned to $3 million in 2005-06. Despite the program's success, COEP funding has not kept pace with inflation. The following chart shows the history of funding for the Centers of Excellence program, through the 2006-07 fiscal year.



Operations and Objectives

The goal of the Centers of Excellence program is to help grow the economy of Utah. When the current Director joined the program, she coined the tagline, "Our job is jobs" and she has shared this perspective with everyone involved with the program. In order to help foster job growth, the COE program encourages licensing of Centers-supported technology to either existing Utah businesses, to help them develop innovative new products and services, or the startup of a new company (called a spin-out). The program continues to mentor some Graduated Centers, introducing them to sources of funding and identifying management and other talent.

Center Selection Process

In late December of each year, the COE program issues an RFP through its website which is advertised to the Universities, their Technology Commercialization Offices (TCOs), existing PIs, and other industry contacts. In response to this RFP, prospective PIs as well as existing Center Directors prepare a proposal for a potential new Center, for a business team grant to assist in preparing a future potential Center or for renewal of funding for an existing Center.

The review process is a very demanding element of the Centers of Excellence program, but also demonstrates the strong support the program has among industry and the overall Utah community. 30 or more individuals with strong technology business backgrounds, all at the Director or VP level and above, volunteer to serve on the Centers of Excellence Advisory Council as reviewers for the program. At least two reviewers, along with the COEP Director and other GOED team members review the written proposal and then conduct a site visit and review. This meeting allows the reviewers to hear directly from the PIs about the technology and business opportunity. After all proposed Centers have received a site visit and evaluation; the Director conducts what is currently a two tier selection process. In the past, the entire Advisory Council would gather in a two day process to discuss each proposal, rate them, and make the final funding recommendations. As the program has grown, that has changed into a two tier process, beginning in 2006. The Advisory Council is divided into three groups, the Life Sciences sub-committee, the Materials/Manufacturing/Energy/Environment sub-committee and the Information Technology/Aerospace/Electronics sub-committee. Each sub-committee meets and does a preliminary ranking of the proposals in their sub-committee, and makes a preliminary funding recommendation. Then, the entire Advisory Council meets together, reviews the recommendations in rank order, and makes the final funding recommendations.

The State Advisory Council (SAC) for Science and Technology has statutory responsibility for advising the Centers of Excellence Program. SAC members participate on the Centers Advisory Council, reviewing proposals and conducting site visits. This provides SAC members with in-depth knowledge of the program, Center specific information, and a strong technical and industrial perspective for making funding recommendations. The SAC also reviews the Centers of Excellence Annual Report before its delivery to the Legislature and publication.

In addition, members of the Governor's Office of Economic Development (GOED) Board also participate in the COE review process. These members are also able to verify that the selection process has been fair and was conducted in a way to help advance economic development in the state of Utah. Once the final list of recommended funding allocations is prepared, the proposed Centers and their budgets are presented to the GOED Board.

Centers of Excellence Program 1986-2006

Report Purpose

Acknowledging two decades of tremendous effort within the state in the Centers of Excellence program, the current Director decided in 2006 to perform primary research into the success of the program to date. Although some sampling data had been captured in past years, it was not a census of the program's past Centers, and it seemed that it would be helpful to reach out to every past and current Center to understand the success of each Center in commercializing its technologies.

Program Directors

The program has had the benefit of six dedicated, and quite long serving, Directors over its 20 year history. This is the first time that the list of all directors and their tenures has been compiled. Almost all of them continue to be active in the commercialization of university-developed technology, either through their industry work, through tenure at the technology commercialization offices of various Utah universities, or through continued service as reviewers for the program.

Tenure	**Director**
1986-1988	Lynn H. Blake, Ph.D.
1988-1993	G. Michael Alder
1994-2000	Roderick J. Linton
2000-2002	Rajiv K. Kulkarni, Ph.D.
2002-Jan 2005	Michael A. Keene, Ph.D., MBA
May 2005-Current	Nicole Toomey Davis, MBA

Centers of Excellence Primary Research and Analysis

Methodology

Research conducted in the summer of 2006 by Vincent Beerman surveyed 75 Center Directors of the 111 Centers of Excellence over the past 20 years. There were 24 Center Directors whose contact information could not be found or who had passed away and 12 who were unavailable during the survey period. Additional research was conducted by Danica Nelson during the end of 2006 and beginning of 2007, and seven of those 12 were surveyed and their updated center information was added to this report. The final date of data collection for this report was February 15, 2006. Former and current Center Directors were asked to update Center accomplishments and provide all available information about benefiting and spin-out companies. A thorough web search was conducted on all listed spin-out and, where possible, benefiting companies. Spin-outs were contacted and asked to verify their association with the center and provide revenue and employee information. Many companies asked us to keep this information confidential or declined our request. Confidential information was used in aggregate data but omitted from the web site and report, or was replaced with publicly available estimates, where available.

Challenges:
It is extraordinarily difficult to accurately measure the effect of a program such as the Centers of Excellence. COEP plants the seeds of business by fostering the development and commercialization of technologies at Utah's universities. Once a technology has been patented and the applications proven, the economic story often diverges and becomes difficult to trace. Some technologies are licensed to several companies, who then integrate them into existing products or build new divisions around them. Frequently, these licenses result in significant job creation in Utah, but it is nearly impossible to measure the number of jobs directly attributable to the Center as the technology is combined with existing company resources and products. Thus, the economic impact of the Center technology and COEP becomes inextricable from the overall success of the licensee.

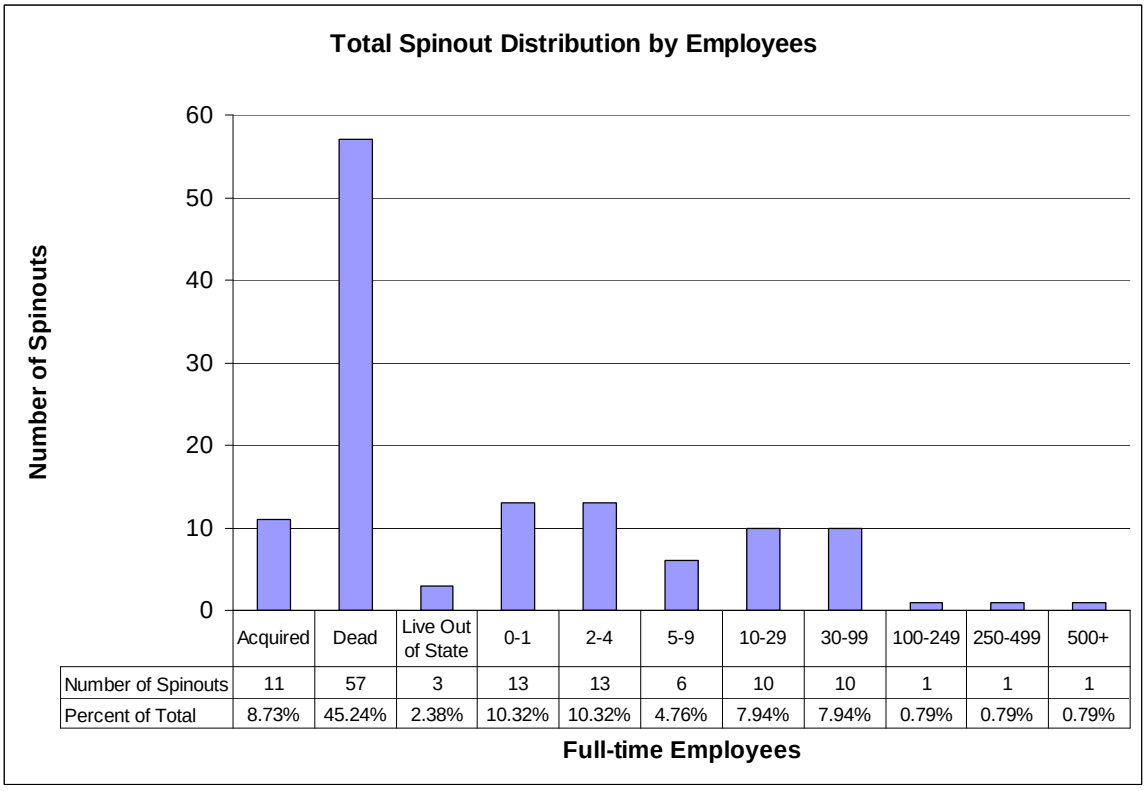
Spin-outs:
Center spin-out companies are easier to measure as they credit their foundation to a Center's personnel and technology. Although over the life of the business there are many inputs (capital, talent, other technologies and assets) that build the business, without the Centers of Excellence Program, that company would likely never have existed. Therefore we can say that COEP 'helped to create' those companies and jobs. However, many Center spin-outs have been acquired over the years. When this happens, the company facility and personnel may remain intact as a subsidiary or division, are released as redundant resources, or are absorbed into the new parent company. For the purposes of this report, if a company was left intact, those employees were still counted in the aggregate statistics. Otherwise, that company is no longer considered a "live spin-out" for the purposes of this report.

Limitations of this report:
As explained, measuring the ***total economic impact*** of the Centers of Excellence Program is difficult and imprecise. Many, if not most, of the jobs created through COEP are now inextricably tied to licensees and acquired spin-out companies across the state and the country. In spite of this difficulty, those spin-outs that we are able to track show that the program has created significant economic growth and job creation in Utah.

Corrected data:
An unpublished internal report in 2003 included some spinouts that were determined during the research of this report to be benefiting companies instead. A correction was made to the 2003 data which resulted in an adjustment of 937 jobs attributed to COEP spinouts being deducted from the initial reported total of 2,008. The corrected total number of jobs created as of 2003 is 1,966. The net increase in jobs from 2003 to 2006 is 922. The corrected ROI for 2003 is 2.04 based on an average salary of $59,000.

Spinout Distribution by Number of Employees

Of the 126 total spinouts in the history of the COEP, 11 have been acquired by companies outside the state of Utah and moved out of state, while three are still live, but were started outside of the state. For the spinouts within the state, 32 have fewer than 10 full-time employees and many of these companies have remained at that level of employment for a significant amount of time and are not likely to grow. There are 20 spinouts with 20-99 employees. Companies that employ more than 100 people bring significant benefit to the state's economy and are likely to stay within the state. These companies are often referred to as "big wins" within the Centers of Excellence community. It is important to note that companies of fewer than 500 employees are still considered small businesses by the Federal Government (for example, in the Small Business Innovation Research (SBIR) Program), but for Utah they contribute significant employment and are therefore very valuable to the state. The COEP has helped foster three such highly-valued companies: Myriad Genetics, Sonic Innovations, and MOXTEK. The following graphs illustrate the distribution of spinouts based on the number of full-time employees, thus demonstrating the history of the program and the benefits it has brought to the state.

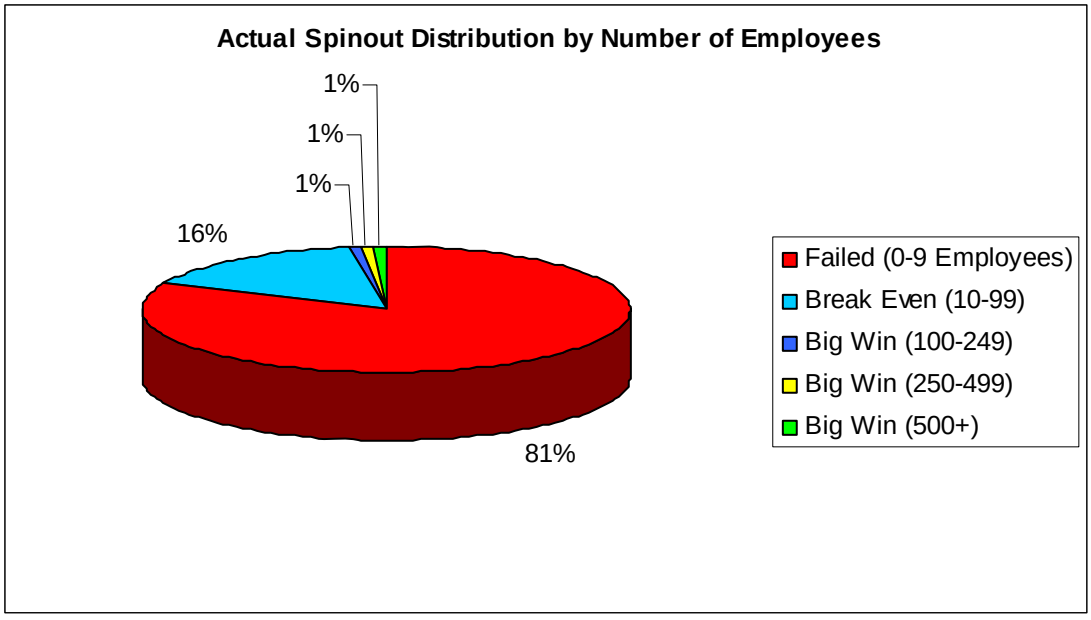


	Acquired	Dead	Live Out of State	0-1	2-4	5-9	10-29	30-99	100-249	250-499	500+
Number of Spinouts	11	57	3	13	13	6	10	10	1	1	1
Percent of Total	8.73%	45.24%	2.38%	10.32%	10.32%	4.76%	7.94%	7.94%	0.79%	0.79%	0.79%

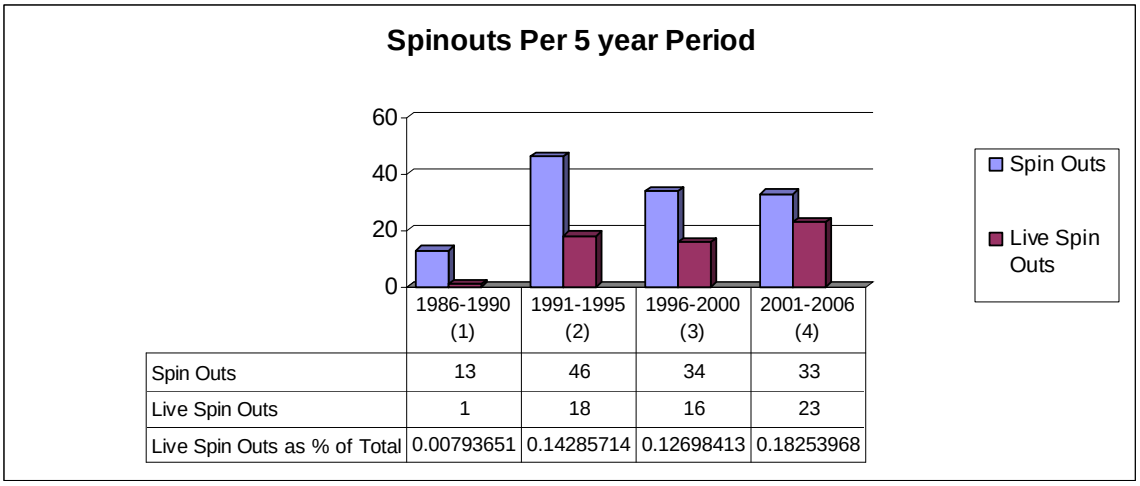
This graph shows the significant number of startups the program has helped to foster. It also points to opportunities to further strengthen the program's ability to position companies for growth to greater than 100 employees. Obviously having spinouts from the Centers of Excellence program grow to greater than 100 employees, the so-called "big wins", is highly desirable. As the graph shows, three of the 126 attempts have achieved this employment level.

As a comparison, the professional venture capital community has an expectation that 10% of their investments will reach the 'big win' category, while 30-40% are considered "losses" and the remaining 50-60% are "break even" in terms of their return to the firm. Of course the venture community's definition of "big win" is much bigger than the COE target, but the "ratio" of various levels of success is relevant.. As part of this analysis, the Director considered that any company that has less than 10 employees will likely never be able to return back to the state the investment that was made, on average over $400,000 per Center. Therefore, all Center spinouts that have failed, been acquired and moved out of state, or started out of state, are considered to have zero employees in the state and are grouped with those spinouts that are live and have 0-9 employees in the category labeled "failed." We acknowledge that in some cases those live spinouts with less than 10 employees may eventually leave that category, but as a rule, if they have never gained momentum, this is very difficult.

The graph below shows the distribution of spinouts by number of employees.

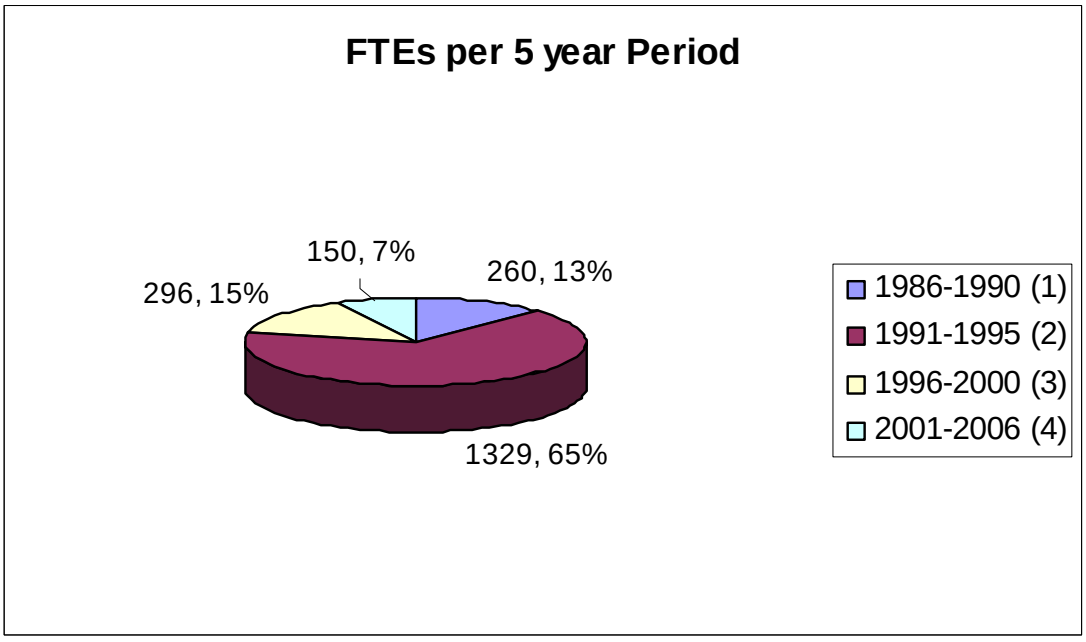


Another interesting way to look at the data is to look at the relative performance among different five-year periods. It is interesting to note that the last 10 years of the program, the number of spinouts has been fairly consistent, and that the number of live spinouts over the past 15 years of the program has also been quite consistent, with the last five years having a higher "live" rate simply due to the fact that some are still in the startup stage and their long term fate is not yet known.



	1986-1990 (1)	1991-1995 (2)	1996-2000 (3)	2001-2006 (4)
Spin Outs	13	46	34	33
Live Spin Outs	1	18	16	23
Live Spin Outs as % of Total	0.00793651	0.14285714	0.12698413	0.18253968

Even more interesting is the distribution of FTE's among the five-year periods. Clearly the period of 1991 to 1995 was the most productive as fully 65% of the people employed at spinouts of the Centers of Excellence program are employed at companies that emerged from this period. It is, of course, important to note that the period from 1996-2000 was a difficult period for startups altogether, both nationally and in Utah, due to the "dot com collapse" and retrenchment in the financial markets that followed the "boom". At the same time, some significant winners in Utah's broader technology landscape did begin in this time frame, so we know that the "external" factors alone cannot account for the very low rate of employment from this period. Of course the period of 2001-2006 has many younger companies and these are expected to have fewer employees this early in their development.



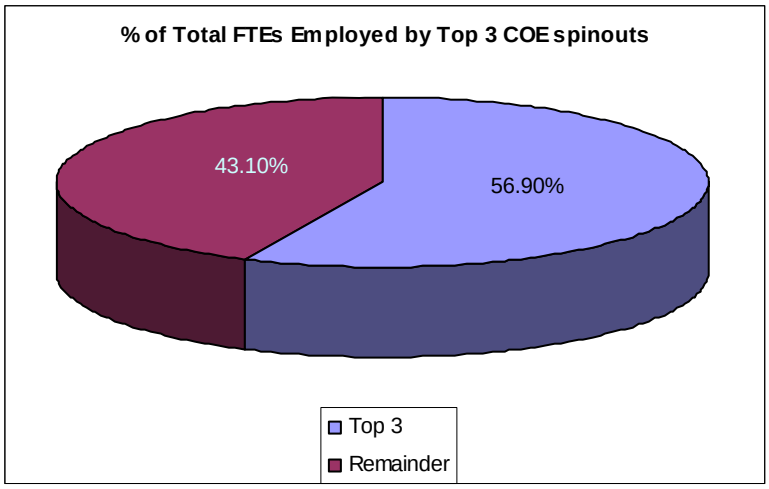
One of the challenges facing this program, a program with job creation and economic development as its primary mission, is the concentration of jobs among the largest of the

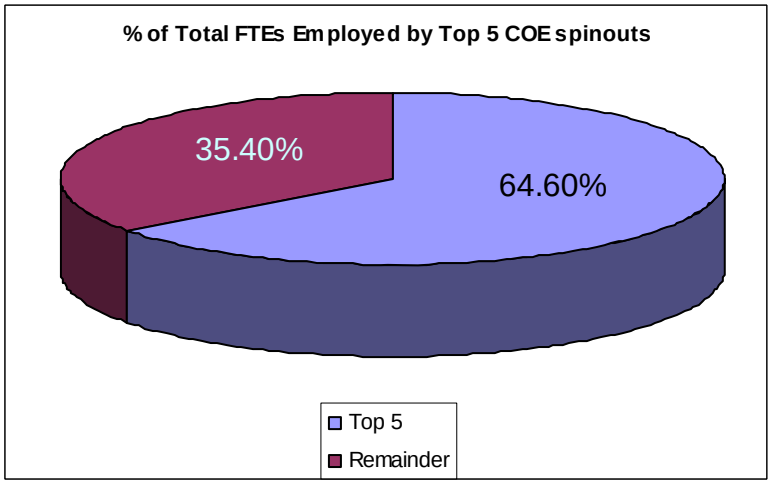
spinouts. Despite the fact that 55 of the 126 spinouts are still 'live' in Utah, the top 10 spinouts by size account for nearly 75% of all employment in the program. This indicates that we could have dramatically larger employment numbers if only some of the smaller firms (10-99 employees) had been able to grow to be larger than 100 employees.

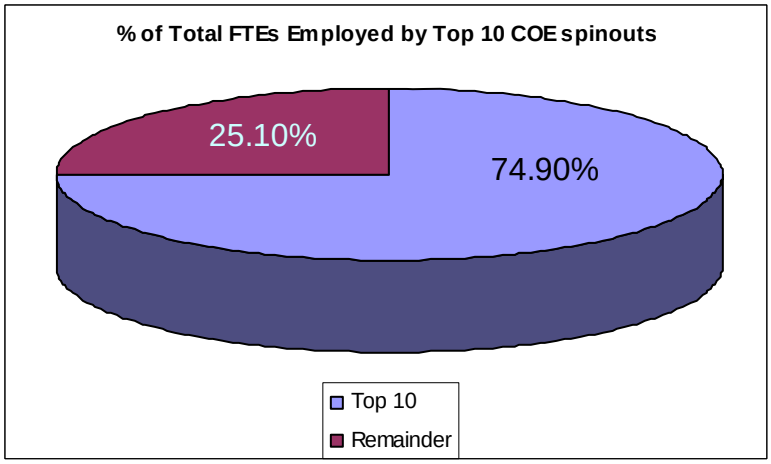
However, this points to a significant opportunity for the program that the current administration is working to capture. If spinouts can be better positioned with capital so that they can gain momentum in their earliest days, combined with increased availability of professional venture capital through the Utah Fund of Funds program, they can capture crucial early market share and presence and emerge as market leaders nationally and globally. It is this type of market positioning that helps companies grow to dominate their markets. Therefore, during the past 2 years of this administration's tenure, we have put in place significant changes that help accelerate business planning and execution for our Centers, as well as a new (in 2007) program to provide grants directly to the licensees of Center supported technologies, thus better positioning them for long term success.

Below are three charts that show the concentration of employees among the top three, top five and top 10 spinouts by size.

Charts showing concentration of employees by spinout size







Below is a list of all of the spinouts identified in this research program, listed by size. Obviously companies change size constantly, but this is a very good look at the relative spinouts that have emerged from the Centers of Excellence program. Size data comes from the primary research conducted for this report, unless otherwise noted.

COE Spinouts By Size (Active spin-outs only)

UNIV	CENTER	COMPANY	STATUS	FTE's
U/U	Cancer Genetic Epidemiology	Myriad Genetics	Live	760
BYU	Signal Processing	Sonic Innovations*	Live	100-249
BYU	X-RAY Imaging	MOXTEK	Live	138
BYU	Advanced Composites	Rocky Mtn. Composites	Live	85
USU	Self Organizing Intelligent Systems	Autonomous Solutions Inc. (ASI)	Live	72
U/U	Engineering Design	Sarcos Medical Corporation*	Live	50-99
USU	Computer Aided Engineering Design	CIMETRIX	Live	45
USU	Computer Aided Engineering Design	PROMODEL Co.	Live	45
USU	Self Organizing Intelligent Systems	Visionary Products	Live	44
U/U	Computer Graphics & Scientific Visualization	Engineering & Geometry Systems	Live	35
U/U	Design Systems	Part.Net (Medibuy)	Live	35
U/U	Controlled Chemical Delivery	Insutech became MacroMed	Live	30
U/U	Electronic Medical Education	Amirsys	Live	30
DIXIE	3D Computer Graphics	InfoWest*	Live	20-49
U/U	Cell Signaling	Echelon Research Laboratories Inc.	Live	25
U/U	Artificial Hearts and Biomedical Devices	Utah Artificial Heart Institute	Live	22
U/U	Neural Interfaces	Bionic Technologies Inc.	Live	22
BYU	Solid Oxide Fuel Cells	Materials and Systems Research, Inc. (MSRI)	Live	20
BYU	Chemical Separations	IBC Advanced Technologies*	Live	10-19
BYU	ACERC	Reaction Engineering Intl	Live	19
BYU	ACERC	Combustion Resources	Live	15
U/U	Inverse Imaging & Tomography	TechniScan	Live	15
U/U	Raman Scattering	Process Instruments	Live	15
U/U	Genome Technologies	Cimmeron Software	Live	8
U/U	Smart Sensors	Live Wire	Live	6
U/U	Direct Machining and Control	Direct Controls	Live	5
USU	Profitable Uses of Agricultural Byproducts	Andigen	Live	5
U/U	Scientific Computing & Imaging	Visual Influence Inc.	Live	5
U/U	Biomedical Microfluidics	Wasatch Microfluidics	Live	4
U/U	CROMDI	Applied Medical Visualization, Inc.	Live	4
U/U	Design of Molecular Function	MicroBioSystems	Live	4
U/U	Design Systems	ErgoWeb	Live	4
U/U	Electronic Medical Education	Visual Share	Live	4
BYU	Miniature Unmanned Air Vehicles	Procerus Technologies	Live	4
BYU	Advanced Structural Composites	IsoTruss	Live	2
U/U	Industrial Imaging	GeoChem Metrix, Inc.	Live	2
U/U	Minerals Technology	Milltech Engineering	Live	2
U/U	Minerals Technology	Mineral Technologies Inc.	Live	2
BYU	Miniature Unmanned Air Vehicles	Flying Sensors	Live	2
U/U	Smart Sensors	RF Innovations	Live	2

UNIV	CENTER	COMPANY	STATUS	FTE's
U/U	Therapeutic Biomaterials	Glycosan Bio	Live	2
U/U	Alternate Strategies for Parasite Removal	Larada Sciences	Live	1
USU	Biotechnology	Intech One-Eighty Corp.	Live	1
U/U	Biomolecular Technologies	GenMetrix, LLC	Live	0
U/U	Computational Design and Testing	Visco	Live	0
USU	High Speed Information Processing	SP Communications	Live	0
USU	Information Technology (Handicapped)	Effective Instructional Technologies	Live	0
U/U	MicroArray Technology	Sigma Technology Holding Company- now Philotek	Live	0
U/U	Nuclear, Medical, and Environmental Technology	Nuclear Labyrinth	Live	0
U/U	Quality and Integrity Design	FASIDE Itnl, Inc.	Live	0
U/U	Quality and Integrity Design	Holsip	Live	0
U/U	Therapeutic Biomaterials	Sentrx Animal Care	Live	0
U/U	Coal Research	FemtoScan Corp.	Live	0
USU	Rapid Microbe Detection	Finite Technologies	Live	0
BYU	Solid Oxide Fuel Cells	Versa Power Systems (VPS)	Live Out of State	40
USU	Self Organizing Intelligent Systems	Kachemak Research and Development	Live Out of State	0
U/U	Therapeutic Biomaterials	Sentrx Surgical - now Carbylan Biosurgery	Live Out of State	0
BYU	Computer Based Education	Cali, Inc. (became Ellis, then acquired by Pearson)	Acquired	45
U/U	Artificial Hearts and Biomedical Devices	Medquest Products	Acquired	30
WSU	Bioremediation	Applied Biosciences Corp.	Acquired	9
U/U	Cell Signaling	Salus Therapeutics	Acquired	6
BYU	Advanced Joining of Materials	Megastir	Acquired	5
U/U	Modified Activated Carbons Technology	INOTECH*	Live	n/a

**Employment Information Source: Division of Workforce Services, Firm Find*

Economic Impact Highlights

- 111 Centers
- Cumulative State funding through June 2007: **$52 million**
- Estimated matching funds: **$272 million**
- Over **126 spin-out companies** - 55 are alive in Utah today
- Spin-out companies impact
    - Employ over 2035 individuals in Utah
    - Average annual salary over $65,000
    - One year wage impact over $132 million
    - Estimated Annual personal income tax generated @ 5% rate = $6.6 million
    - COEP avg. funding last 5 fiscal years = $2.37 M/year
- Annual ROI = State tax revenue / avg. annual funding
- Annual Return on Investment = $6.6M / $2.37 M = **2.81**

Matching Funds

Under the statute changes passed during the 2006 Legislative session, Centers at a university that awards doctoral degrees ("the doctoral granting institutions") are required to have 2:1 matching funds. This is because these institutions have significant Federal research programs which bring with them momentum and many helps in identifying and securing funding. At universities without these robust, doctoral granting programs, securing research funds is more challenging. Therefore, in the 2006 session, the Utah state Legislature modified the matching requirement so that Centers at non-doctoral granting schools were not required to have the 2:1 match, and in policy the program adopted a 1:1 matching requirement. All matching funds are reviewed through the Center's annual reports. A key element of the program is the emphasis during the renewal process on the achievement of milestones and commitment to commercialization.

Center of Excellence funds are credited by many researchers as "priming the pump" for additional research funds. Although COEP requires a 2:1 matching funds ratio for doctoral granting institutions, most Centers raise considerably more in outside funds from federal and private grants. Although this money is spent on a variety of equipment and activities, some of which leaves the state, much of it goes to pay local researchers' salaries and local utilities and supplies. At the time of this report, matching funds data was available for 34 centers. The ratio of matching funds to those provided by COEP was 5.24:1. Assuming this ratio is representative of all the Centers, approximately $272 million has been funneled into Utah through the Centers since 1986.

Metrics by Cluster, School and Age of Center

The success of the COEP program is demonstrated in the following metrics that are grouped by clusters, institution, and age quartile (the year in which the Center operated expressed in quarters of the COEP's 20-year history.) Performance indicators include the number of centers that were funded, the number of spinouts created, the number of companies benefiting through a license agreement, full-time employees of the spinouts, revenue generated by the spinouts, and that revenue divided by the number of centers.

Clusters	# of Centers	# Total Spinouts	# Live Spinouts	# Benefit-ting Co's	FTEs	Avg Salary	Reported Revenue ($M)	Average Jobs/ Center	Revenue/ Center
Aerospace	4	9	2	5	6	$86,667	2	1.5	$450,000
Competitive Accelerators	27	19	11	289	277	$61,000	12	10	$450,741
Defense & Homeland Security	3	6	5	1	124	$45,000	10	41	$3,333,333
Energy & Natural Resources	12	11	9	31	108	$76,830	15	9	$1,288,333
Life Sciences	34	45	19	53	1,316	$58,778	119	39	$3,485,294
Software & IT	31	36	12	39	204	$70,521	26	7	$830,645
Total	**111**	**126**	**58**	**418**	**2035**		**$183.7**		
Institution									
U of U	61	57	36	82	1180	$68,589	110.25	19	$1,807,377
USU	23	27	9	34	126	$60,000	10.26	5	$446,087
BYU	21	28	12	293	695	$62,686	59.17	33	$2,817,619
WSU	4	5	0	8	9	$50,000	1	2	$250,000
Dixie	1	5	1	1	25	$0	3	25	$3,000,000
UVSC	1	4	0	0	0	$0	0	0	$0
Total	**111**	**126**	**58**	**418**	**2035**		**$183.7**		
Age Quartile									
1986-1990 (1)	9	13	1	18	260	$0	0	29	n/a
1991-1995 (2)	29	46	18	148	1329	$63,282	139.37	46	$4,805,862
1996-2000 (3)	31	34	16	221	296	$76,923	23.4	10	$754,839
2001-2006 (4)	42	33	23	31	150	$65,449	20.91	4	$497,857
Total	**111**	**126**	**58**	**418**	**2035**		**$183.7**		

Outstanding Successes

The following descriptions provide additional insight into some of the successful and emerging spinouts that are powering job creation in the State of Utah. This list is only meant to provide a sampling of information. Appendix A provides a summary of every Center of Excellence since the inception of the program, and includes contact information and a list of spinouts.

Myriad Genetics (MYGN) - 1991

A spin-out from the Center for Cancer Genetic Epidemiology at the University of Utah, Myriad is a biopharmaceutical company that develops novel healthcare products to address some of the most pervasive diseases such as cancer and Alzheimer's. Their products include predictive cancer products in addition to drug therapeutics. The company is a leader in cancer prediction medical products, such as BRACanalysis for breast cancer and COLARIS for colon cancer. Myriad also develops and markets predictive and personalized medicine products. Currently, the company is engaged in the largest placebo-controlled study ever undertaken of an investigational medicine in patients with Alzheimer's disease.

Myriad was formed in 1991 and went public in 1995, with an initial public offering valued at $54 million. In 2005, the company earned revenues of $82 million with 760 full time employees and a median salary of $58,000. Approximately 660 of those employees reside in Utah. As of February 2007, the company was valued at $1.51 billion.

Sonic Innovations (SNCI) - 1995

A spin-out from the Center for Signal Processing at Brigham Young University, SONIC innovations has become the fastest growing hearing aid company in the world. Through the development of patented digital signal processing technology at Brigham Young University, the company produces the smallest single chip platform ever installed in a hearing aid. The success of the companies product is a direct result of the developments at BYU that give the hearing aids the ability to accurately reproduce natural sound from an extremely small device.

Sonic Innovations was founded in 1995 and went public in 2000 with an initial offering of 3,600,000 shares at $14.00 per share.. The company received total net proceeds, including the exercise of the over allotment, of $53.9 million. Sonic has grown to more than $100 million in revenue with operations in nine countries. The company was valued at $187 million in February 2007. The company employed 634 individuals in 2005, 110 of which are in Utah with an average salary of $80,000.

Moxtek - 1986

A spin-out from the Center for Xray Imaging at Brigham Young University, Moxtek is an OEM provider for X-ray analytical products and wire grid polarizers for projectors and rear-projection televisions. The company was founded on specialized optical technology developed at Brigham Young University. Their polarizer technology is a leader in the projection industry, and is used in most major-brand high definition televisions. Moxtek was awarded the 2002 Silver Award by the Society for Information Display (SID) in recognition of its ProFlux polarizer.

Moxtek was founded in 1986 by a group of professors and was acquired as a wholly owned subsidiary of Polatechno in 2004. The acquisition kept intact Moxtek headquarters in Orem, UT and retained the company name and personnel. Through the increased access to capital, Moxtek has been able to expand capacity. This has led to increases from $9.4M in sales and 60 employees in 2004 to 138 full time employees with an average salary of $36,000 and $31 million in sales in 2006.

Autonomous Solutions Inc. – 2000

A spin-out form the Center for Self Organizing Intelligent Systems at Utah State University, Autonomous Solutions, Inc. produces unmanned vehicle systems based on technology developed at Utah State University. The company has developed products for many top companies, including a robotic vehicle for Goodyear to safely test tires without human drivers. The company has received such a high interest in its products that it is actually turning down customers, according to the founder. Recently, ASI won a million-dollar grant to develop an unmanned vehicle for the Department of Defense's Grand Challenge in November 2007. The company will be competing against major corporations such as Lockheed Martin and Boeing.

ASI was founded in 2000 by Mel Torrie, who was a graduate student working in the Center at USU. The company now has over 72 full-time employees earning an average of $45,000 and 2006 revenues were over $7 million.

Cimetrix (CMXX) - 1985

A spin-out from the Center for Computer Aided Engineering Design and Manufacturing at Utah State University, Cimetrix is a public company located in Salt Lake City, UT that designs factory automation software for the global semiconductor and electronics industries. Cimetrix's PC-based motion control software is used by leading equipment manufacturers for demanding robotic applications. One of the company's most recent products, CIMPortal, has been selected for Semiconductor Equipment and Materials International's (SEMI) Interface A standards compliance by 50 percent of the top 20 largest semiconductor equipment suppliers in the world.

Cimetrix was founded in 1985 based on open architecture motion control software developed at Brigham Young University. Cimetrix used this core PC based technology to develop a unique software framework bringing to life the Cimetrix Open Development Environment (CODE). The company continues to receive worldwide recognition and increasing sales. 2006 revenues were $5.637 million with 45 full time employees worldwide, 36 of which reside in Utah. The company was valued at $9.2 million in February 2007.

Flying Sensors - 2006

One of two spin-outs from the Center for Miniature Unmanned Air Vehicles at Brigham Young University, Flying Sensors is a full-service, aerial-based, data collection company. Their unique approach combines aerial photography and video with unmanned air vehicles and aerial sensing technology developed at Brigham Young University to provide aerial detail not available by traditional means. The company integrates these technologies with their patent-pending analysis and presentation tools to give its customers a complete aerial imaging product. Their products

and services are used for many imaging applications such as real estate, environmental studies and motion pictures.

Flying Sensors was founded in 2006 by Bob Carter and Brian Odette. The company currently has 2 full time employees with an average salary of $100,000. Flying Sensors will record its first revenues in August 2006.

Procerus Technologies - 2004

The second spin-out from the Center for Miniature Unmanned Air Vehicles at Brigham Young University, Procerus designs small automatic pilots for miniature unmanned air vehicles using leading edge technology developed at Brigham young University.. This technology led to the company's premier product, the Kestrel. This is the smallest and lightest autopilot on the market and is used by military and research institutions. In addition, the company offers ground control software to be fully integrated with the autopilot.

Procerus Technologies was founded in 2004 by the Center Director and partners. In 2005, Procerus had approximately $1.8 million in revenues with 4 full time employees averaging $80,000 in salary.

InfoWest - 1994

A spin-out from the Center for 3D Computer Graphics at Dixie College, InfoWest has been a leading provider of high quality Internet services to the Utah community since 1994 and was the first to offer Internet services to Southern Utah. Being the first provider in this community led to the company's name being synonymous with the Internet. Even today, with many competitors in the area, InfoWest maintains the majority share of the market. InfoWest continues to lead by providing fiber-optic transmission and advanced spam and virus filtering.

Established in 1994, InfoWest came together under through a group of former IT students at Dixie College under the direction of Eric Pedersen. The idea was born when this group helped to equip the college campus with Internet service. InfoWest has since had a ten-year up-trend in revenue and has spun-out several other companies including NetEx.net, DevShed.com and 32Bit.com. The company currently has approximately 49 full time employees in Utah.

LiveWire Test Labs - 2003

A spin-out from the Center for Smart Sensors at the University of Utah, LiveWire Test Labs provides technologically advanced and easy to use products for identifying the nature and location of faults in live electrical wiring systems. The company was founded on technology developed at the University of Utah, called Spread Spectrum Time Domain Reflectometry (SSTDR). This technology allows testing on live wiring systems and is able to detect problems that traditional methods have failed at. SSTDR is capable of sensing faults in the wiring without interfering with normal operation, thus making it useful in a multitude of applications, such as on aircraft during flight. This is particularly beneficial for use on aging aircraft for compliance with FAA standards.

LiveWire was founded in 2003 by the Center Director, Cynthia Furse and partner Paul Smith. The company currently has 6 full time employees and is growing rapidly.

Andigen, LC - 2003
A spin out from the Center for Profitable Uses of Agricultural Byproducts at Utah State University, Andigen designs and builds high rate anaerobic digester systems for animal waste. The patented digester processes animal waste into methane gas which is pumped into an engine and converted into electricity. This allows farmers to manage pollution and odor, and gives them an additional revenue stream if they choose to sell the electricity back to the utility company. The methane gas may also be used to produce biodiesel.

Andigen is growing rapidly with worldwide sales out of its headquarters in Logan, UT. Founded in 2003 by the Center Director - Dr. Conly Hansen and partners, Andigen maintains ongoing research collaboration with Utah State University. Revenues from 2005 were $260,000 and 2006 revenues are forecasted at $1.5-$2M. In 2006 there were 5 full time employees with an average salary of $75,000.

Perspectives About the Centers of Excellence Program

SSTI
"Utah's approach is unique -- the partnership between economic development, the tech transfer office, and the commercialization transfer office, makes sense and seems to be working. …I can't point to any other program that has the same results."

--Dan Berglund, President and CEO, SSTI -State Science and Technology Institute

MedQuest/Worldheart
"I recently sold the company that I co-founded (MedQuest Products Inc.) to a publicly-traded company, WorldHeart. My company was a spin-off of the Center for Artificial Hearts at the University of Utah, which is a Distinguished Center of Excellence and has obtained COE funding/support since 1988 for both Artificial Hearts ('88-'92) and Ventricular Assist Devices (1 yr in the mid-90s). The COE support for VAD commercialization was very important at that time- we used COE-recommended commercialization consultants and also worked with the UU Tech Transfer Office to get things moving for my business. This early support has played a role in our success so far: from Mar-June 2006 we had our first successful patient experience with our revolutionary VAD. The news of this implant was carried all over the world: Russia, Australia, South Korea, India and so on… (including the US and Europe of course). I believe it demonstrated and reinforced Utah's leadership in this field that had been established in 1982 with the first implant of a long-term artificial heart in Dr. Barney Clark- a heart that was developed by Symbion (at that time a UU spin-off) and the Center for Artificial Hearts."

-- Pratap Khanwilkar, PhD, MBA, VP: Rotary Systems & Business Development Worldheart, Inc.

Center for Thermal Management Technologies
"It is my observation that most university faculty in engineering and science are talented, dedicated, hard working people with more great marketable ideas than they have time to develop without substantive encouragement and support. Academics are often not business oriented

people and so many ideas with potential commercial application languish and miss the passing window of opportunity. Utah's COEP provides the needed incentive and support for busy faculty to develop their ideas into useful products. Students involved have their education enhanced by real world applications as the states economy is benefited. It seems like a win-win all around. Please count me as an enthusiastic COEP advocate."

--J. Clair Batty, Trustee Professor Emeritus, Utah State University

Flying Sensors

The Centers of Excellence (COE) program has been on of the key stepping stones to launching Flying Sensors. I was a consultant for the BYU magic lab (the Center for Miniature Unmanned Air Vehicles) that focused on small unmanned aerial vehicles. My partner, Brian Odette and I quickly realized the commercial potential for their technologies in an industrial setting. Most UAV work was focused on the military and this left a great opportunity to integrate existing technology into a new vertical market. The first grant we received from the COE program allowed us to immediately get matching funds from a private investor. The COE, private equity and revenue funded the first year growth and infrastructure development. As founders we utilized the income from our consulting efforts to buy the assets necessary to launch a successful unmanned aerial product and service company. The COE funds provided operating capital to hire the necessary personnel to get the company launched. The second year award is critical as we expand our efforts and hire additional personnel to accelerate our growth. I have been an entrepreneur of many different startups. I see COE providing the essential bridge to motivate people to take the necessary risk to spin research technologies out into industry. I am proud to be associated with this program and lead the way for other future companies.

--Bob Carter, CEO, Flying Sensors

Future Research

The depth of primary research conducted for this report provides significant insight into the program's performance. However, some crucial questions emerged from this data that will form the basis for future research to help strengthen the program and Utah's economy. These questions include: Why did so many spinouts fail outright? Are the issues related to management? Capital? Licensing issues and terms? PI focus and involvement? Are these still barriers or have any/all issues been resolved? What issues remain to be resolved?

Other questions that need additional research to answer include: Why did three of these spinouts start out of state entirely? What ingredients in Utah's economy were missing or what problems were there? Why did so many of these spinouts get "stuck" in the 0-9 employee category? What are these companies doing and how are they structured? Are the PI's still involved? Who else is employed by these companies? Why didn't more of the 10-99 employee companies keep growing to breach that 100 employee mark? How did Utah's private sector startup community fare relative to the COE startup community? What are other states doing in the very early seed stage area and how successful are their programs? How does Utah's COE Program compare against these other programs in terms of effectiveness and what might some additional "best practices" be?

And finally, looking for opportunities to replicate success leads to questions such as: What were the key elements that helped to contribute to the success of the three "big wins" that did occur? How could those same factors be brought to bear on a wider segment of Centers spinouts?

More information about the benefiting companies and the level of benefit received from their work with the Centers would be helpful. In the end, did any of them license and use Center technology to significantly grow their businesses? How? What works/doesn't work in the company/professor/university relationships?

Future research efforts will be made to answer these and other questions that emerge.

Program Evolution – Building on Success

The Centers of Excellence Program is building on the past 20 years of success. Based on successful examples of technology commercialization, the COE Director, under the new leadership of the Governor's Office of Economic Development, is working to strengthen those elements of the program that have been crucial to success as well as to introduce new opportunities.

Accelerate time to market

Funding Period Compressed to Four Years

During the first 19 years of the program, the funding time frame allowed a maximum of five years for a Center. During the 05-06 fiscal year, this time frame was compressed from five years to four years – with roughly the same amount of money allocated to each Center over the history. The purpose of this change is to accelerate commercialization and reduce the time to market.

In addition, the COE program implemented a system to provide business team assistance to "Potential Centers" before they receive full funding in order to improve their performance during their funded time as a Center. This replaces the past "planning grants" (typically around $5,000) that were made directly to a potential Center. Instead, this money is directed to the business team for assistance during the year. During the 2006 selection process this was expanded to authorize approximately $75,000 to fund pre-proposal business team assistance (enough for 5-7 Centers) before they applied to the COE program. All of this is intended to help prepare university teams for the COE program, to facilitate the selection process and to further accelerate commercialization.

The first example of a new team with this support occurred during the 05-06 year. During the 2006 selection process, one seasoned COE Reviewer said, "I had to keep reminding myself that this was a new Center, their presentation was so good!"

Business Expertise Essential to Success

Throughout most of the program's history, Utah has sponsored "COE consultants" to work with each Center. These consultants spent about 80 hours per year working with a given Center. They were paid through the universities by a block grant provided by the state and were selected by the universities from a list of consultants approved by the State.

For the 2005-06 fiscal year, the former "COE consulting program" underwent a complete overhaul to result in the COE Business Team program. Under the Business Team program, seasoned technology executives, serial entrepreneurs, and market experts were recruited through a statewide RFP to meet the specific needs of each Center. In addition, the funding level was increased to pay for approximately 250 hours of assistance per year for each Center, significantly increasing the ability of the Business Team members to help move the technologies out of the university and into industry.

This enhancement builds on the historical importance of providing business expertise to complement the technical expertise of each Center, while helping to pair entrepreneurs and seasoned executives with the Centers as part of the process of building strong startup and "go to market" teams. In addition, the Centers program has emphasized that licensing to an existing Utah company is a very positive outcome and has encouraged our business team members to search out Utah firms which might have an interest in these technologies.

Industry-University collaboration

A major objective of the Centers of Excellence program under the Huntsman Administration is to significantly increase the interaction between members of industry and university talent in order to facilitate the exchange of technologies and opportunities. Strong economies around the world are built around the movement of technologies from research institutions into industry, and the subsequent flow of funds and talent back to the institutions. It is the goal of the COE Director that the Centers of Excellence Program can help increase this virtuous cycle in Utah and further strengthen our high tech economy.

Changes in Legislation

Utah's Legislature is very sensitive to the value of technology based economic development and the current Director has taken the opportunity to approach the legislature twice to ask for changes that strengthen the COE statute and enhance the program.

2006 Legislative Changes

During the 2006 Legislative session, Senator Thomas Hatch sponsored Senate Bill 112, with House sponsor Representative Peggy Wallace. The centerpiece of this bill was changes in the COE statute which were implemented to encourage the non-doctoral schools in the State to participate in the COE program by reducing the matching requirements for those schools from 2:1 to 1:1. In addition, when a doctoral-granting school and a non-doctoral granting school partner in a so-called "supercenter", the non-doctoral granting school is not required raise any matching funds, although the doctoral granting school still maintains its 2:1 matching requirement.

Matching Requirements for schools that do not offer Doctoral degrees

During the 2006 legislative session, the Utah State Legislature passed, with no dissenting votes, SB 112, Centers of Excellence Amendments. One of amendments included in this bill narrowed the requirement of the 2:1 match to schools that offer Doctoral degrees (language listed below). This statutory change also required match guidelines for schools that do not offer doctoral degrees. The new guidelines are listed below.

Statutory Change

"The Legislature recommends that the governor consider the allocation of economic development funds for Centers of Excellence to be matched by industry and federal grants on at least a two-for-one basis for colleges and universities in the state that offer any doctoral degrees"

New Guidelines:

- For a non-doctoral-degree granting school, a stand-alone Center will be required to have its Centers of Excellence funds to be matched by industry and federal grants on at least a 1:1 basis.
- When a non-doctoral-degree granting school partners with a school that does grant doctoral degrees, the non-doctoral-degree granting school will not be required to have a match for their portion of the COE funding. The doctoral-granting school will be required to meet their 2:1 match as per statute.

Note: The COE Statute specifies that, "Proposals or consortia that combine and coordinate related research at two or more colleges and universities shall be encouraged."

Additional changes by the Legislature modified the Accountability of Licensing Decisions in Centers of Excellence. Excerpts are included below.

Accountability of Licensing Decisions in Centers of Excellence

During the 2006 legislative session, the Utah State Legislature passed, with no dissenting votes, SB 112, Centers of Excellence Amendments. The Second Statutory Change in SB 112 is detailed below.

"The Governor's Office of Economic Development shall develop a process to determine whether a college or university that receives a grant under this part must return the grant proceeds if the technology that is developed with the grant proceeds is licensed to a licensee that:

(i) does not maintain a manufacturing or service location in the state from which the licensee or a sublicensee exploits the technology; or

(ii) initially maintains a manufacturing or service location in the state from which the licensee or a sublicensee exploits the technology, but within five years after issuance of the license the licensee or sublicensee transfers the manufacturing or service location for the technology to a location out of the state."

The Governor's Office of Economic Development is currently in the process of establishing the process specified in the statute. The State Advisory Council on Science and Technology, as requested by the Office, has convened a task force to make recommendations to GOED on this process. In addition, the Governor's Office of Economic Development Board will provide final review and approval of the process.

Procedural Updates

In February of 2006, in order to continue strengthening the program, the COE Director took before the State Advisory Council of Science and Technology a series of procedural enhancements and clarifications which were approved. These are listed below.

Centers support for licensed technologies

- Past: once a technology was licensed to a company, the Center could no longer be funded or support the technology.

Opportunity:

- Permit a Center to continue to support a licensed technology for a certain period of time or under certain conditions in order to better support the transition from university to industry.

New Guideline:

- When a Center-supported technology is licensed to an existing established firm, the Center can use the COE funding to support that technology through the end of the current fiscal year (i.e. current contract).
- When a Center-supported technology is licensed to a startup/spinout, the Center can use the COE funding to support that technology through the end of the current fiscal year (i.e. current contract).
- In addition, the Center may apply for renewal of funding from the COE program (subject to the normal term of up to 4 years), to enable the Center and Business Team to continue to support the technology AND those commercial applications UNTIL a) the startup/spinout completes an arms-length financing transaction with a value equal to or greater than $500,000 or b) the startup/spinout is awarded one or more contracts with a value equal to or greater than $500,000.
- In all situations, if there are still significant applications of the technology available for licensing (other vertical markets) the Center may apply for renewal of funding from the COE program on a competitive basis.

Ability to Start the COE Funding Clock over for new Opportunities

- Past: Once a Center was "done" with one round of funding, they could not really "come back" into the program unless it was a "new Center" (with new PI)

Opportunity:

- Proposed: Dynamic Centers teams and PIs have many areas of research that can provide new Market Opportunities
- COE should encourage them to continue to bring new technologies to the program for new Market Opportunities

New Guideline:
A former Center of Excellence (one that has "graduated"), may return to the program and request a new series of funding years, typically up to 4 years, as long as the technology that is being proposed for commercialization is different enough from the original Center to create new market, business and licensing opportunities. However, it should NOT be used to extend the life of a Center that failed to achieve their commercialization goals. The Center may either keep its same name with a differentiating designation (example "Center II"), OR may propose under a new name. The PI may be the same PI or may be a different PI (but there is no requirement to make a change).

Center Designation – Funding + 3 years

- Past: Conflicting interpretations of use of "Utah Center of Excellence" Title

New Guideline:
A Center can use the "Utah Center of Excellence Designation" (and logo) for the term of funding plus 3 years. After that they can refer to being a "former Utah Center of Excellence". If, after 3 years, a Center is still actively supporting the commercialization of the technology which was funded through the Center, they may apply to the Director for an extension of the use of the title.

Clarification: The name of the Center ("Center for New Technology") is not covered by this guideline and it is up to the college/university, PI and team to determine its appropriate use.

Additional Item of Clarification from the Feb 13, 2006 Meeting of the SAC

The council concurs with the Director that PI's/Researchers do NOT have to be tenured to be considered as a Director for a Center of Excellence.

2007 Legislative Changes

During the 2007 Legislative session, Representative Bradley Daw sponsored House Bill 125, with Senate Sponsor Senator Sheldon Killpack. The goal of this statutory change was to permit the program to make funding grants directly to licensees of university technologies. It was clear from research and experience with the program that the COE funded ended frequently at precisely the moment it was most needed – when the technology rolled out of the university and into the company.

Utah's Legislature agreed that it was a wise use of state funding to help defray the real and perceived risk in licensing university technologies. The funds are specifically earmarked to help existing firms and startups fund the transition and "go to market" work of getting the technology out of the lab and into a product. These funds require a 1:1 match from the company and those funds can be founder cash contributions, investor funds, or sales or contract revenue. The 2007-08 selection process will the first time that such funds are available to licensees (companies).

Tables of Centers and Spinouts

Below are lists of the Centers and their spinouts, organized in a variety of formats to share insights about the program's history.

Centers by Cluster

The Centers are linked to their respective websites where links to the universities, spinouts, and annual reports can be found.

CLUSTER	CENTER	FUNDED	GRADUATED	SCHOOL
Aerospace	Space Engineering	1986	1991	USU
	Advanced Satellite Manufacturing	2004	2006	USU
	Miniature Unmanned Air Vehicle	2004	Currently funded	BYU
	Aerospace Science Technology	1987	1992	Weber State
Competitive Accelerators	Chemical Reactors	1989	1990	U of U
	Pyrometallurgical	1988	1989	U of U
	Advanced Materials & Microelectronics	1987	1992	U of U
	Engineering Design	1987	1992	U of U
	Quality & Integrity Design	1989	1991	U of U
	Advanced Construction Materials	1993	1997	U of U
	Composites in Construction	1998	1999	U of U
	Harsh Environmental Electronics	1995	2000	U of U
	Raman Technology	1996	1998	U of U
	Computational Design & Testing	2002	2004	U of U
	Functionally Graded and Designed Cemented Tungsten Carbide and Polycrystalline	2006	Currently funded	U of U
	Magnetic Sensor & Actuator materials	2005	2006	U of U
	Nanosize Inorganic Material Powders	2004	Currently funded	U of U
	Novel Titanium Boride Surface Hardening Technology	2003	Currently funded	U of U
	Rapid Prototyping	2001	2004	U of U
	Utah Research Institute	1987	1992	USU
	Control of Flow in Manufacturing	2006	Currently funded	USU
	Thermal Management Technologies	2006	Currently funded	USU
	Advanced Composites Manufacturing & Engineering	1989	1995	BYU
	Chemical Separation	1987	1992	BYU
	Computer Aided Engineering Design & Mfg (CA2EDM)*	1988	1992	BYU
	Application Center for Materials Engineering	1996	1997	BYU
	Rapid Product Realization	1993	1996	BYU
	Advanced Joining of Materials	1999	2004	BYU
	Advanced Structural Composites	1998	2003	BYU
	Compliant Mechanisms	1999	2004	BYU
	DMAC--Direct Machining & Control	2002	2005	BYU
	Smart Sensors	2000	2005	U of U
Defense	Self Organizing Intelligent Systems	1993	2000	USU
	Advance Imaging LADAR	2003	Currently funded	USU

	Coal & Oil / Coal Research	1987	1991	U of U
	Coal Processing Technology	1996	1998	U of U
	Minerals Technology	1995	1999	U of U
	Acoustic Cooling	2000	2004	U of U
	Modified Activated Carbons Technology	2005	Currently funded	U of U
Energy & Natural Resources	Petroleum Research	2000	2005	U of U
	Solid Oxide Fuel Cell Technology	1996	2001	U of U
	Solid Waste Recycling	1990	1993	USU
	Profitable uses of Agricultural Byproducts	2000	2005	USU
	Advanced Combustion Engineering Research	1987	1995	BYU
	Supercritical Fluid	1987	1991	BYU
	Solvent Separation of Heavy Oils	1996	1997	Weber State
	Laser Institute	1986	1989	U of U
	Artificial Hearts & Biomedical Devices	1987	1992	U of U
	Biopolymers at Interfaces	1986	1991	U of U
	Cancer Genetic Epidemiology	1990	1995	U of U
	Controlled Chemical Delivery	1986	1993	U of U
	Environmental Technologies	1993	1995	U of U
	Biomolecular Technologies	1998	2000	U of U
	Cell Signaling	1997	2002	U of U
	Genome Technologies	1996	1998	U of U
	Neural Interfaces	1995	2000	U of U
	Ventricular Assist Device	1995	1996	U of U
	Alternate Strategies Parasite Removal (CASPeR)	2004	2006	U of U
	Biomedical Microfluidics	2004	Currently funded	U of U
	Biomedical Optics	1999	2003	U of U
	Homogeneous DNA Analysis	2003	Currently funded	U of U
	In Situ Ozonator	2003	2004	U of U
Life Sciences	Microarray Technology	2005	Currently funded	U of U
	Nuclear, Medical and Environmental Technologies	2001	2003	U of U
	Therapeutic Biomaterials	2004	Currently funded	U of U
	Vascular Biotherapeutics	2001	2003	U of U
	Biotechnology	1987	1992	USU
	Design of Molecular Function - Environmental	1988	1994	USU
	Dairy Foods Technology	1990	1996	USU
	Developmental & Molecular Biology	1992	1998	USU
	Genetic Improvement In Livestock	1993	1997	USU
	Meat Processing Technology	1990	1996	USU
	Value Added Seed Technology	1990	1997	USU
	Dairy Technology Commercialization	1998	2001	USU
	Rapid Microbe	1998	2003	USU
	Signal Processing	1986	1990	BYU
	X-Ray Imaging	1987	1992	BYU
	Applied Molecular Genetics	1995	1998	BYU
	Chemical Technology	1989	1995	Weber State
	Bioremediation	1996	2003	Weber State
Software and IT	Base Education Technologies	1987	1988	U of U

Communications Research	1986	1990	U of U
Inverse Problems, Imaging & Tomography	1989	1993	U of U
Software Science	1989	1994	U of U
Supercomputing	1988	1992	U of U
VLSI Design	1990	1992	U of U
Asynchronous Circuits	1997	2000	U of U
Computer Graphics & Scientific Visualization	1990	1996	U of U
Design Systems	1995	1996	U of U
Electronic Systems Technology	1995	1999	U of U
Industrial Imaging	1996	1999	U of U
MTV Flat Panel Display Technology	1995	1997	U of U
Multimedia Education & Technology - U of U	1993	1997	U of U
Scientific Computing & Imaging	1996	2000	U of U
Electronic Medical Education	1999	2004	U of U
Global Knowledge Management	2003	2005	U of U
Interactive Ray-Tracing & Photo-Realistic Visualization	2005	Currently funded	U of U
Multi-Dimensional Information --CROMDI	2000	2005	U of U
Organic Electronics	2006	Currently funded	U of U
Computer Networks	1987	1989	USU
Information Technologies (handicapped Education)	1988	1991	USU
Magnetism in Information Technology	1995	1996	USU
High speed information processing- CHIP	2002	2006	USU
Computer Integrated Manufacturing	1987	1989	BYU
Parallel Supercomputing	1988	1989	BYU
Computer Based Education	1987	1991	BYU
Acoustics Research	2005	Currently funded	BYU
Advanced Communications Technology	2004	Currently funded	BYU
Intelligent Computer Tools	1996	2001	BYU
Multimedia Education & Technology - UVSC	1992	1995	Weber State
3D Computer Graphics / 3 D Software	1990	1996	Dixie State

Spin Out Companies

By Center

SCHOOL	CENTER	COMPANY	STATUS
DIXIE	3D Computer Graphics	AK international	Dead
		Illustrative Impressions	Dead
		InfoWest	Live
		NetEx	Dead
		Paintbrush Productions	Dead
BYU	ACERC	Combustion Resources	Live
		Reaction Engineering Intl	Live
BYU	Advanced Composites	Rocky Mtn. Composites	Live
BYU	Advanced Joining of Materials	Megastir	Acquired
BYU	Advanced Structural Composites	IsoTruss	Live
		Patterned Fiber Composites	Dead

		TauRuss	Dead
WSU	Aerospace Technology	One Stop Satellite Solutions Inc.	Dead
		Wasatch Aerospace Co.	Dead
U/U	Alternate Strategies for Parasite Removal	Larada Sciences	Live
U/U	Artificial Hearts and Biomedical Devices	Medquest Manufacturing	Dead
		Medquest Products	Acquired
		Utah Artificial Heart Institute	Live
U/U	Base Technical Education	Assessment Co.	Dead
		Software Co.	Dead
U/U	Biomedical Microfluidics	Wasatch Microfluidics	Live
U/U	Biomedical Optics	Carroderm	Acquired
		Nutriscan	Acquired
		Spectratek	Dead
U/U	Biomolecular Technologies	GenMetrix, LLC	Live
U/U	Biopolymers at Interfaces	HCP Diagnostics	Dead
		Protein Solutions, Inc.	Dead
WSU	Bioremediation	Applied Biosciences Corp.	Acquired
USU	Biotechnology	Intech One-Eighty Corp.	Live
U/U	Cancer Genetic Epidemiology	Myriad Genetics	Live
U/U	Cell Signaling	Echelon Research Laboratories Inc.	Live
		Salus Therapeutics	Acquired
BYU	Chemical Separations	IBC Advanced Technologies	Live
WSU	Chemical Technology	Linco Technology (now First Scientific)	Dead
U/U	Coal Research	FemtoScan Corp.	Live
		International Resin Resources	Dead
U/U	Computational Design and Testing	Visco	Live
USU	Computer Aided Engineering Design	CIMETRIX	Live
		Design Synthesis	Dead
		PROMODEL Co.	Live
BYU	Computer Based Education	Cali, Inc. (became Ellis, then acquired by Pearson)	Acquired
U/U	Computer Graphics & Scientific Visualization	Engineering & Geometry Systems	Live
BYU	Computer Integrated Manufacturing	CAM Software	Dead
		CIM Training Center	Dead
		EDGE Foundation	Dead
		EDGE Inc.	Dead
		Ozone Saver Industries	Dead
		Smartware	Dead
		Utah PODS Manufacturing Co-op	Dead
U/U	Controlled Chemical Delivery	Insutech became MacroMed	Live
U/U	CROMDI	Applied Medical Visualization, Inc.	Live
USU	Dairy Foods Technology	Dairy Research Consulting of Utah	Dead
		Food Research & Dev Group	Dead
		Utah Milk Technology	Dead
U/U	Design of Molecular Function	Envirol	Acquired
		MicroBioSystems	Live
		Whetstone	Dead
U/U	Design Systems	ErgoWeb	Live
		Part.Net (Medibuy)	Live
USU	Developmental & Molecular Biology	PanGenics, Inc.	Dead

U/U	Direct Machining and Control	Direct Controls	Live
U/U	Electronic Medical Education	Amirsys	Live
		Global Matics	Acquired
		Visual Share	Live
U/U	Electronic Systems Technology	Bonneville Technologies	Dead
		HDG	Dead
U/U	Engineering Design	Animate Systems	Dead
		MicroJect, Inc.	Dead
		Sarcos Medical Corporation	Live
USU	Genetic Improvement of Livestock	Livestock Molecular Research & Development Inc.	Acquired
U/U	Genome Technologies	Cimmeron Software	Live
U/U	Harsh Environment Electronics (formerly MTV Flat Panel)	Innosys	Dead
		Radiant Labs	Dead
USU	High Speed Information Processing	SP Communications	Live
U/U	Industrial Imaging	GeoChem Metrix, Inc.	Live
USU	Information Technology (Handicapped)	Effective Instructional Technologies	Live
U/U	Inverse Imaging & Tomography	Monolithic Tech	Dead
		TechniScan	Live
USU	Meat Processing Technology	Canyon Rayas	Dead
		Mountain Lamb (land?) Co-op	Dead
		Timpanogos Meats	Dead
U/U	MicroArray Technology	Sigma Technology Holding Company- now Philotek	Live
U/U	Minerals Technology	Milltech Engineering	Live
		Mineral Technologies Inc.	Live
BYU	Miniature Unmanned Air Vehicles	Flying Sensors	Live
		Procerus Technologis	Live
U/U	Modified Activated Carbons Technology	INOTECH	Live
UVSC	MultiMedia Ed & Tech (UVSC)	Cela Solutions Inc.	Dead
		MC2	Dead
		Memory Lane Productions	Dead
		Utah Valley On-Line	Dead
U/U	Neural Interfaces	Bionic Technologies Inc.	Live
U/U	Nuclear, Medical, and Environmental Technology	Nuclear Labyrinth	Live
USU	Profitable Uses of Agricultural Byproducts	Andigen	Live
U/U	Quality and Integrity Design	FASIDE Itnl, Inc.	Live
		Holsip	Live
U/U	Raman Scattering	Process Instruments	Live
USU	Rapid Microbe Detection	Bio Matrix Solutions	Dead
		Finite Technologies	Live
	Rapid Prototyping	Unknown Name	Dead
U/U	Scientific Computing & Imaging	Visual Influence Inc.	Live
USU	Self Organizing Intelligent Systems	Autonomous Solutions Inc. (ASI)	Live
		Kachemak Research and Development	Live - Out of State
		Monetary Services Inc.	Dead
		Visionary Products	Live
BYU	Signal Processing	ASTECH	Dead
		Deseret Digital Designs	Dead
		Sonic Innovations	Live

		Vector Technologies	Dead
U/U	Smart Sensors	Live Wire	Live
		RF Innovations	Live
U/U	Software Science	Hippo Software, Inc.	Dead
BYU	Solid Oxide Fuel Cells	Materials and Systems Research, Inc. (MSRI)	Live
		Versa Power Systems (VPS)	Live - Out of State
USU	Space Engineering	CXT, Inc.	Dead
		Globesat Holding Co.	Dead
		ICOMP, Inc.	Dead
		Interactive Resources Co.	Dead
		Medcom, Inc.	Dead
USU	Supercritical Fluid	Lee Scientific	Acquired
U/U	Therapeutic Biomaterials	Glycosan Bio	Live
		Sentrx Animal Care	Live
		Sentrx Surgical - now Carbylan Biosurgery	Live - Out of State
USU	Value Added Seed Technology	F1 Technologies	Dead
USU	Vascluar Biosciences	Hydra Bioscience	Dead - Formed Out of State
U/U	VLSI Design	Bonneville Microelectronics	Dead
BYU	X-RAY Imaging	MOXTEK	Live